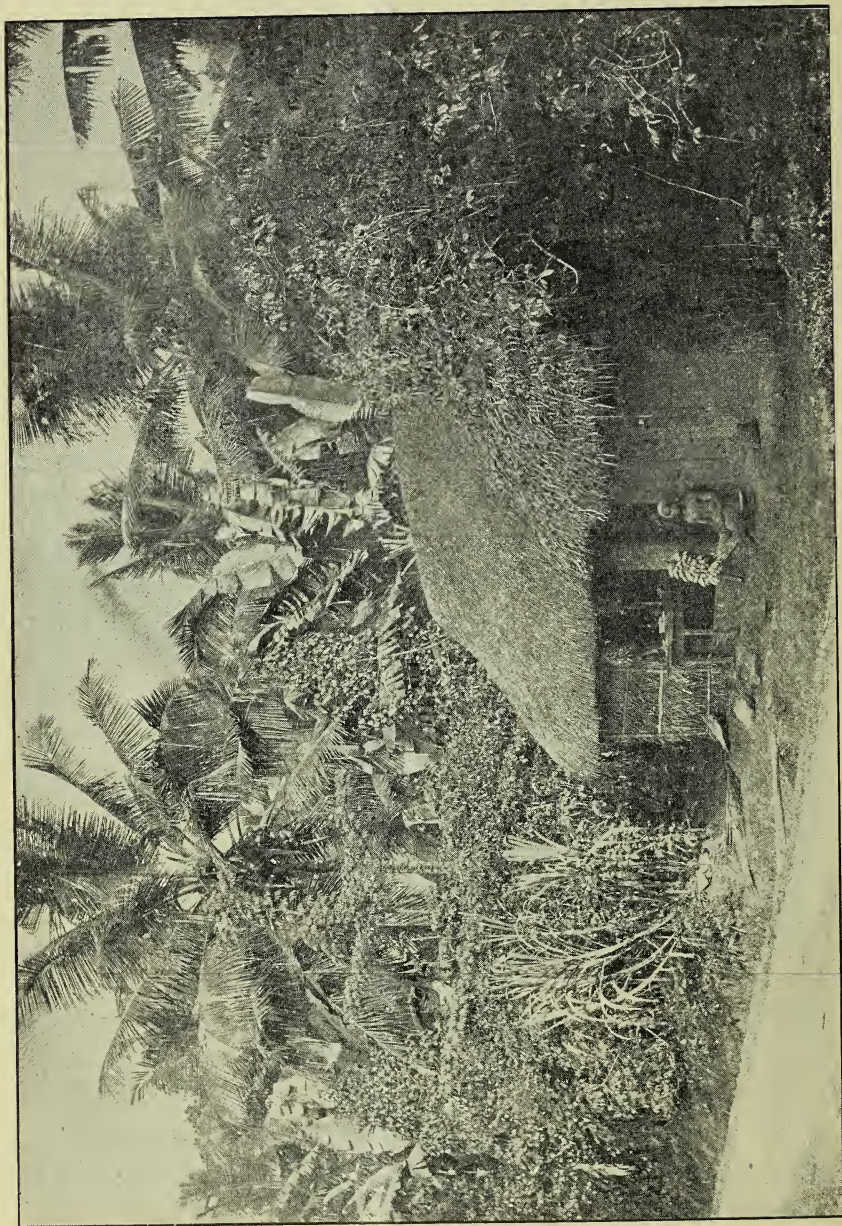


## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



CHARACTERISTIC VEGETATION ABOUT THE HUT OF A NATIVE CEYLON.



# THE AGRICULTURAL STUDENT.

VOL. VII. OHIO STATE UNIVERSITY, COLUMBUS, OCTOBER, 1900. No. 2.

TERMS OF SUBSCRIPTION:

|                    |        |
|--------------------|--------|
| One Year.....      | \$0.50 |
| One-half Year..... | .30    |
| Single Copies..... | .05    |

While this magazine is published with the approval of the President of the University and the Officers of the College of Agriculture and Domestic Science, the editors are responsible for the statements in all unsigned articles.

Address all communications to the Business Manager, Agricultural Student, Columbus, Ohio.

Entered at the Post-Office, Columbus, Ohio, as second-class matter.

PUBLISHED MONTHLY BY

THE AGRICULTURAL STUDENT PUBLISHING COMPANY.

|                   |                  |
|-------------------|------------------|
| A. G. McCALL..... | Editor           |
| W. D. GIBBS.....  | Business Manager |

STAFF.

|                |                     |
|----------------|---------------------|
| C. B. STEWART. | E. L. SHAW.         |
| M. B. LAMB.    | C. C. HAYDEN.       |
| C. N. MOONEY.  | MISS MAMIE F. HILL. |

EDITORIAL CHAT.

“To all the leaves on every bough  
The Fall’s bright hues are lent;  
The press of Time is printing now  
Its colored supplement.”

By a blunder in making up the final form of our last issue the resume of an article by E. L. Johnston on The New Cereal, Cotton Seed, in which he severely criticises the “Grout Bill,” was given space in the editorial column and thereby given editorial sanction. We wish to correct the false impression made thereby, as to the attitude of THE STUDENT on the oleo question, and take pleasure in presenting to our readers the other side of the question in a well-written article by Professor Decker, of the Ohio State University.

It is not the policy of the student to enter into controversy over such matters, but circumstances over which we had no control have led us into our present position, and we feel that it is only just that both sides should be given a hearing, and that THE STUDENT clear itself of any charge of prejudice in the matter.

In conclusion we wish to say that THE AGRICULTURAL STUDENT is published by agricultural students for agricultural students, and will always be

found ready to do anything in its power for the advancement of scientific agriculture and the promotion of agricultural education.

The State Board of Agriculture, after long deliberation, have reluctantly consented to hold the State Fair of 1901 for two weeks. The board seems to doubt the wisdom of the move from a financial standpoint, and will make the change only on condition that the city of Columbus make a guarantee deposit of \$10,000 to secure them against possible loss.

From the farmer’s standpoint we believe the extension of the time is a move in the right direction. Many farmers and stockmen at a distance from Columbus do not feel justified in sending exhibits to the fair for only a few days, because of the expense and trouble incidental thereto; whereas if they can exhibit their stock or produce for two weeks they feel that they are getting an adequate return for their expenditure of time and money.

Through the kindness of Mr. Price, secretary of the Columbus Horticultural Society, we are enabled to print an interesting article on tropical agriculture, by Dr. Wilcox, an alumnus of O. S. U. After taking his doctor’s degree at Harvard he was sent by that

institution for a year's travel and study in the Orient. The accompanying cuts were made from photographs selected from a collection of nearly one hundred, taken by Dr. Wilcox while on his trip.

The Hessian fly is largely responsible for the failure of the wheat crop of 1899 and 1900 in Ohio. The Experiment Station Bulletin No. 119 says:

"In point of destruction, the Hessian fly outranks every other insect, when considered in connection with the wheat crop of 1900. It is doubtful if there will be over 20 per cent. of an average crop, the balance of 80 per cent. may be largely charged up to the ravages of this pest. As an average crop in Ohio amounts to approximately 40,000,000 bushels the loss may be computed at 32,000,000 bushels, which, at the ruling market price would mean a loss of \$22,400,000, at least three-fourths of which or \$16,800,000 can justly be charged up to the ravages of the Hessian fly.

### **Spraying as a Protection Against Frost.**

Mr. F. K. Luke, of the Botanical greenhouse, has been conducting experiments for the purpose of determining some convenient means by which the outdoor bedding season can be lengthened and outdoor plants protected from the early frosts of September and October.

On the night of October 16 the temperature went down to 30°, and on the following night to 28°, with heavy frosts on the morning following. Both of these nights the plants, such as cannas, colens and dusty millers were successfully protected by spraying them with water on the evening before, and thus charging the air with moisture in that immediate vicinity.

### **That Oleo Question.**

If I want to eat oleo I do not know as it is anybody's business, and if I go to the store and ask for oleo and get butter, and suppose that it is oleo, that I am getting I am subjected to a fraud.

On the other hand, if I ask for butter and get oleo that has been colored yellow, and put up in packages just like butter, that is also a fraud.

The enormity of the *fraud* appears when we remember that oleo can be produced for seven cents a pound and ought to retail at ten or twelve cents a pound instead of bringing 25 cents, when it masquerades in the same package and color as butter.

When the oleo manufacturers are talking to the Southern people they tell them that oleo is made almost entirely out of cotton seed oil; when they talk to the people of Illinois they say it is mostly lard, and when they talk to the cattle raisers they call it tallow; but we cannot see how they can get the greater part of cotton seed oil, lard and tallow, each into the same oleo.

We do know that chemical analyses have in a number of cases shown the presence of paraffine, an indigestible mineral substance, in oleo, and some very pertinent questions have been asked about where the dirty fats in the rendering tanks go to.

Now about the Grout bill. We have a law taxing oleo two cents a pound and requiring it to be branded. The internal revenue officers are very careful to collect the tax but practically ignore the branding clause. To make them more careful in this matter the Grout bill has been proposed. This bill reduces the tax on uncolored oleo to one-half cent, just a nominal tax, but still enough to make Uncle Sam's representative look after it. The poor man can then buy it for ten or twelve cents. The oleo people try to make the labor-

ing man think that they have a bonanza when they can pay double this price for it when they ask for butter and get the seven-cent oleo colored and put up in packages just like butter. The bill goes further and puts a tax of ten cents a pound on oleo when it is colored like butter. This will make Uncle Sam's representatives very careful to distinguish between the colored and uncolored, and at the same time take the immense profits out of the oleo which is used largely to fight honest butter. Thirty-two states including fifty-two millions of the sixty millions of people in the census of 1890, have laws prohibiting the coloring of oleo in semblance of butter. These laws have repeatedly been held to be good laws and constitutional, but the fourteen oleo trusts in the country encourage the retail dealers to break down these laws by promises of protection. With their immense profits they make lawing too expensive for the states to engage in. The state of New York, with its millions of people, used less than 300,000 pounds of oleo last year, but the officers of the law had to go clear to Chicago for evidence, and that is expensive. The oleo trusts claim the right to break down these state laws under the guise of interstate commerce. While the ruling of the United States Supreme Court is to the effect that the states have the right to enact laws for the general welfare of the people, without interstate commerce interference, it is expensive business carrying each case up to the highest court, and there are also delays. The Capital City Dairy Company, of Columbus, Ohio, have been defeated in a case before the State Supreme Court, but they have carried the case up to the United States Supreme Court, and in the meantime they are doing business and breaking the laws of the people as before. The Grout bill also concedes

the right of the states to pass such laws regarding oleo.

Now, when some one gets up and says that the Grout bill is class legislation and aimed at the people of the South, it is a misrepresentation. The Grout bill puts a tax of ten cents a pound on oleo, only when the grease is colored like butter, and when it is colored in that way and put up in butter tubs, pound prints, and "catch country rolls" to deceive the consumer, it is an insult to the seven millions of farmers, with their millions of dollars invested in the dairy business, and to the millions of people in other walks of life who want to get butter when they ask for it and pay the price.

What about the 800,000 milch cows in Ohio, and the \$500,000,000 invested in the dairy business in Ohio? What are you going to do about it?

I will tell you what to do. See your candidate for Congress, and see that when he gets into Congress on the sixth day of next December, that he votes for the Grout bill. It will come up for passage at that time.

### **Glimpses of Tropical Agriculture.\***

BY EDWIN MEAD WILCOX, PH. D.

Your Secretary has asked me to bring to you to-day some message from the Orient concerning questions of mutual interest and concern. I am pleased to accept this invitation, not only on account of my great interest in the subject of my address, but also for the pleasure it affords me of appearing before this Society again after so long an absence from Columbus.

In confining my statements in general to certain salient features of tropical agriculture, I refer you for perfect word-pictures of tropical life, to such well

\* Read before the May meeting of Columbus Horticultural Society,



known authors as Wallace, Bates and Hudson, whose classical works are unequaled for their clear, accurate, scientific descriptions and fine literary form, combined with intense interest.

Never before has the attention of all the nations been so much turned toward the tropics, and particularly to the Orient, as to-day. The condition of many of our own people is shown by the protests raised against the extension, by our Nation, of its civilization and commerce to distant tropical lands. It is, however, a hopeful fact that growth cannot permanently be either checked or prevented by declarations or enactments. Our theme is, therefore, of uncommon interest at this particular period.

With face turned toward the Orient, my first glimpse of anything like real tropical life was at Port Said, the city built upon the sand, at the entrance to the Suez Canal. Here one will have glorious bargains in many departments pressed upon him by representatives of all the tropical peoples.

The slow progress made by the great floating palace through the canal allowed me to see much of the characteristic desert flora. The plants one sees here and there in the great desert have lost all resemblance to their allies of temperate zones, in their adaptive changes induced by the surroundings.

The extensive cultivation of sugar cane in Egypt is a demonstration of the triumph of modern engineering skill over insufficient natural water supply. Leaving the Red Sea at the English stronghold, Aden, I proceeded direct to Colombo, in Ceylon's Isle, "where every prospect pleases" in the combination of cinchona, tea and cacao estates in the midst of dense tropical vegetation of a green much darker than is ever seen in the foliage of this region.

About Colombo, and to the north along the coast, are great plantations of

cinnamon bushes in a soil of nearly pure white sand. Much of this soil is the property of the Government, though leased and cultivated by English planters and companies. But the "spicey breezes" of the poet are never enjoyed by modern tourists.

Ceylon, like all tropical islands, has a coast border of cocoanut trees—this very characteristic tropical plant of uncertain origin whose wide distribution by ocean waves has caused it to appear as indigenous in so many tropical lands. But in Ceylon the systematic cultivation of the cocoanut has been taken up and is being conducted upon a very large scale. The nuts as they reach us have had their thick, fibrous covering removed. These coverings are allowed to decay in stagnant water some time to facilitate the removal of the fibers, and whether this "coir" fiber finds its way into the large local factories or is made up by the native Cingalese women, the great variety of useful products is quite astonishing.

The fresh juice of the nut furnishes a most refreshing beverage that, to the mind of the native at least, is considerably improved by long fermentation. The meat of the nut is only eaten by natives as an ingredient, when ground, of the universal curry powder they use on their rice and meats. The extraction of the cocoanut oil from the meat of the nuts has become a great industry, particularly in the hands of the natives.

You will want to know what the cultivator of cocoanuts must do to insure success, for you must dismiss from your minds at once the idea that "intensive agriculture" is only known in northern climes. In fact I must say now that both the Dutch and English planters, in the places I visited, make great demands for advice and assistance upon their botanic gardens and experiment stations, and, as here, the response of the scien-

tific men in the tropics is ever enthusiastic and helpful.

The preliminary clearing off of the dense jungle and digging of proper sized holes at regular distances is the pioneer work—and tropical jungle vegetation has much more courage and dogged persistence in encroaching upon cultivated soil than do our own weeds.

The cocoanuts, previously soaked in water for some time, are planted out very close together on a small piece of soil used as a nursery. When the plants are about one or two feet high they are placed carefully in the holes and watered at intervals until they have made a good start.

From this time, if weeding is carefully done and insect depredation guarded against, five to six years will give one a plantation furnishing a small yield. The trees continue bearing until they are forty or even eighty years old, though these last figures are rather exceptional.

So far as Ceylon is concerned, no systematic attempt has been made to increase the production of the trees in any way by the judicious application of manure, etc. The "breeding to point" has in the Straits Settlement given the planters the so-called "Champion" coconut, whose merits are sufficiently shown by the photograph.

I have mentioned but a few of the many uses made of the cocoanut tree by the natives—it has been said that the native who plants by his hut a cocoanut tree, a jack tree and a few banana trees has done his full duty towards the support of his family and descendants. The photograph representing a native before his hut in Ceylon confirms this statement.

Many of the low-land districts are being occupied by a new industry that owes its origin, like cinchona culture, to the indefatigable zeal and energy of tropical explorers in South America. I

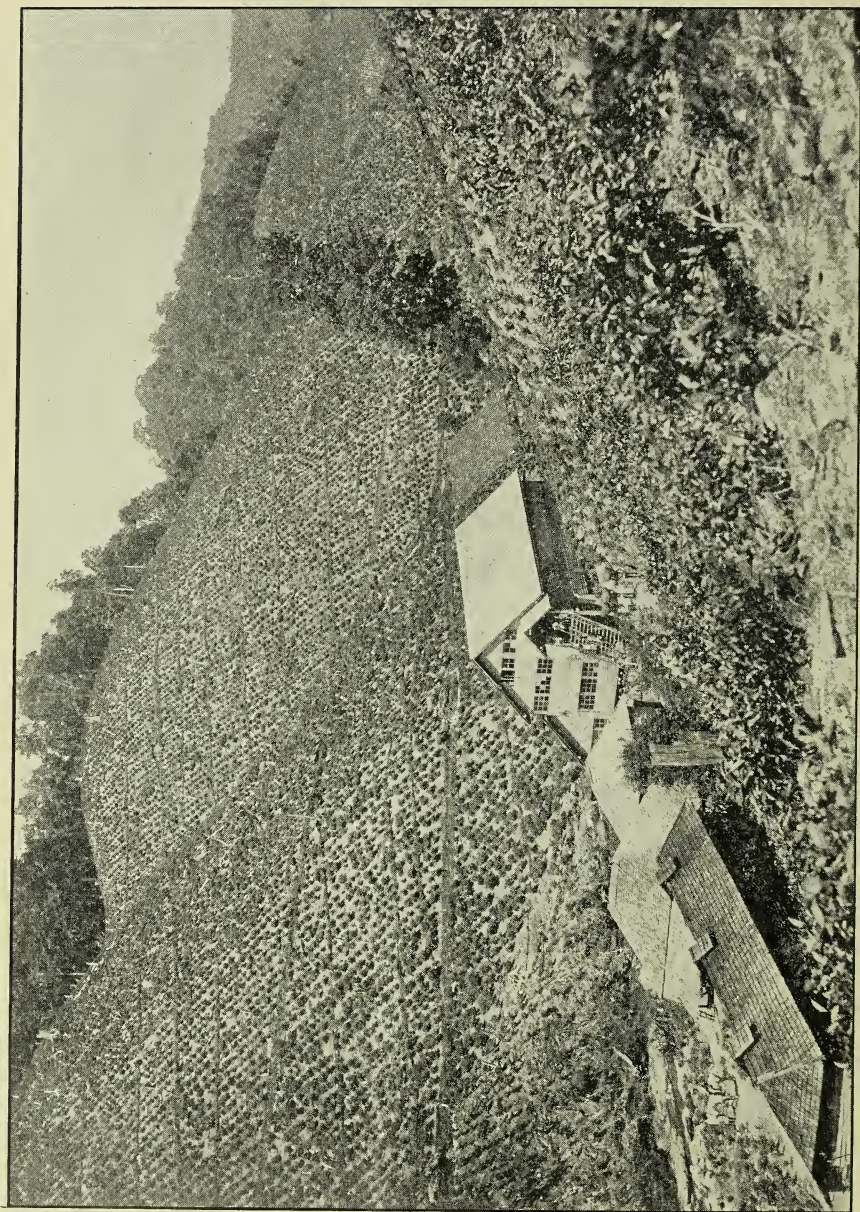
refer to the cultivation of various trees yielding caoutchouc. Through the energy of the lamented Dr. Trimen, late Director of the Royal Botanical Gardens at Peradeniya, Ceylon, many seeds of the Para, Ceara and Manihot rubber trees were distributed to various persons in Ceylon, India and elsewhere. And, though as yet caoutchouc has not entered the export list of Ceylon, the industry promises well for the future. Possibly the cultivation of no other plant in the tropics has raised so many difficult problems and so severely taxed the experience of botanists, chemists and agriculturists.

But we must go up to the hill-sides about Kandy and Peradeniya to see at its best Ceylon's greatest staple product—tea. Many of the hill-sides along this forty miles of railway are covered with the most beautiful terraced rice fields. The natives here, as throughout the tropics, are very skilled in the preparation of these terraced fields. The network of waterways for the irrigation of these rice fields owes its existence or at least its upkeep, to the English Colonial Government, since the idea of "public works," or even of a "public" seldom if ever occurs to a native with clearness. Here as in our own midst, public property is the most conveniently stolen by the individual.

As we reach the higher elevations the great tea plantations on the distant hills appear as toy gardens made by the mountain fairies rather than marks of the ruthless advance of English business men. With a feeling of sorrow we recall the days when these same tea-covered hill-sides enriched their owners with their prolific yields of coffee. These are the "good old days" of which the planters still love to speak.

But there came some unknown blight—the Botanic Garden called attention to it in warning notes, but few really ap-





TEA PLANTATION AND FACTORY IN CEYLON.



preciated and fewer heeded the warning. And even before this fearful fungus parasite had received its well earned name of *Hemileia vastatrix*, the coffee industry of Ceylon was doomed to destruction. Utter ruin stared in the faces of these coffee planters of the "seventies," who had long depended entirely upon coffee cultivation. But with true Anglo Saxon courage and endurance an agricultural miracle was wrought which has no equal on all the pages of history. Who of us can picture to ourselves the trials and hardships of such a period of transition from a completely destroyed industry to another requiring the purchase of entirely new machinery and the acquaintance with quite different methods of cultivation. But the great crisis had taught them agriculture as well as economy.

The greatest lesson taught by the widespread devastation of the coffee industry in this manner was the great unwisdom of complete dependence, in the tropics at least, upon one industry. Similar conditions in the British West Indies called for the appointment of a Royal Commission to examine into the ways and means of increasing the prosperity of these islands, and the unanimous report of the Commission and its learned expert, Dr. Morris, was to encourage the so-called minor industries.

Mr. J. H. Hart, of Trinidad, in a masterly paper on the minor industries, said: "I consider that it is the duty of every tropical colony (especially those entirely dependent on the soil for their prosperity) to institute numerous "side" industries as safe-guards, and possible substitutes, should anything go wrong with the main cultures."

And so, though tea cultivation may long remain the main industry of Ceylon, the minor industries soon to be named are of great importance as substitutes in time of adversity.

I was able to visit several large tea

estates whose product is sold by the Lipton syndicate, and to study in detail under the guidance of the skilled managers and superintendents the entire subject.

Many are planting cacao trees over their ground, though these cannot with great profit be planted among the tea-bushes and give at the same time the required shade. In the North Matale district I saw fields of over five hundred acres planted to cacao. Some of the varieties are found to be more disease-resisting than others, but as yet no large systematic attempt has been made to secure by hybridisation and artificial selection, a cacao tree resistant to disease and yet prolific.

Cacao trees have their flowers emerging from the bark of the trunk and larger branches. This habit is, indeed, not unusual among tropical plants, as is well seen in the photograph of the jack tree. The old cacao trees are, if diseased or severely injured, best cut back to the ground and tared over—the fresh young shoots will in a few years yield a good crop.

I can in passing simply name the other minor industries of some importance in Ceylon: peppers, Cardamons, cinchona, beetlenut palm and ginger.

A voyage of six days brought me to Penang, a small island lying off the west coast of the Province of Wesley of the Malay Peninsula, while another day found us entering the beautiful harbor of Singapore, the great metropolis of the East. The name Singapore is given both to the city and the small island upon which it is located.

Lack of time prevented me from accepting the invitation of Mr. Ridley, the genial Director of the Botanic Gardens here, to go with him on a botanical exploring expedition up into the untouched jungle of the peninsula. We should have gone on the backs of elephants and with a party of twenty-five

or thirty Malays to carry our provisions, tents and material collected. The great wealth of the Botanical Garden Herbarium surely testifies to Mr. Ridley's skill in executing these jungle excursions, where no traffic manager must be consulted for cheap rates.

Singapore enjoys rather unique meteorological conditions in that the rainfall is uniformly distributed throughout the year. There are, therefore, no seasons in this region. From an ecological standpoint this region offers a very interesting study. One cannot say beforehand when a certain plant will flower or when its leaf buds will expand. The sugar cane planter may plant and cut his harvest every month of the year, and his factory is in constant operation throughout the year. And much the same is true of other products. It is an interesting sight to see the natives sowing the rice seeds, transplanting the young rice plants and harvesting the grain in adjoining fields at the same time.

Singapore at present handles much of the world's supply of spices, while its beautiful flowers, luxuriant vegetation and great variety of tropical fruits are admired and enjoyed by all tourists. Only a few of these fruits can rightly be referred to as objects of systematic cultivation on a large scale even by the native Malay or Chinese.

Pineapple cultivation is prominent over the entire island and promises to eclipse many other industries. The great size and remarkable sweetness of these Strait's Settlement pineapples make them much desired as a desert by tourists and residents. Such tropical fruits as the mango, jack, breadfruit, doekul, ramboetan, mangosteen and banana are here in great abundance and perfection.

But I am impatient to give you some idea of Java, "the Garden of the East." From Singapore a sixty-hour passage in a Dutch vessel carries one past the

shores of Sumatra to Tandjong Priok, the present harbor for Batavia, the capital of the island. The eruption of Mt. Salak about the middle of the seventeenth century sent so much silt down the Tji Liwong that the harbor at Batavia had to be abandoned and a new one at Tandjong Priok built by the Dutch Government at considerable expense.

Batavia, the three-century old "Queen of the East," was for years the graveyard of tens of thousands of Europeans before the mandates of sanitary science were fully recognized and obeyed. The quaint old city retains none of the old walls and defenses that encompassed it during the period that the Dutch East India Company held the place and carried on their trade with the natives under their pernicious policy.

I cannot detain you, much as I should like, to see the beautiful new suburb of Weltevreden, with the Governor General's palace and the residences of most of the Europeans, nor can we visit the collections and beautiful building of the world-famed society, the "Koninklijke Natuurkundige Vereeniging," the Zoological Gardens, or the quaint old "Stadthuis," where all foreigners are required, within three days after their arrival, to secure a "toelatings-kaart," or permit, to travel in Java.

Buitenzorg, the "sans souci" of the Dutch in Netherlands, Indie, lies hidden at the base of two great volcanic mountains, Salak and Gedeh, only forty miles away. Here, from the veranda of the Bellevue Hotel, I looked upon the most beautiful and luxuriant tropical landscape I may ever expect to enjoy, with the slumbering Salak full before me, its three-pointed peak hidden in a column of fluffy white clouds, and its base reaching down to the deep palm-covered valley of the Tji Liwong, rushing madly on to the ocean past my very feet.





*Artocarpus Integrifolia*, THE "JACK" TREE, SHOWING SIZE AND APPEARANCE OF ITS LARGE FRUITS.

The Governor General's palatial residence lies in the midst of beautiful grounds adjoining the Botanic Gardens, the 'Hortus Borgoriensis' of botanists, the oldest and finest living museum of its sort in all the world.

Dr. Melchior Treub, Director of the Garden, will soon complete his twentieth year of service in Java. Dr. Treub's name is known to the botanists of all nationalities who have read his remarkable and epoch-making scientific publications. He has gathered about him a large staff of specialists in the various fields of botanical activity that come closest in touch with the agricultural interests of the island. All these men have special laboratories for their departments, each with an equipment far superior to that of many European and American laboratories.

A description of some of these departments will serve as an introduction to our remarks upon the agriculture of the island. For the investigation of agriculture from a purely experimental and chemical standpoint the laboratories in the center of the branch Agricultural Gardens are provided. Here, under the direction of Dr. Von Romburg, is a large staff of men busy at present largely with the problems incident to the present introduction and extension of tea cultivation in Java. The grounds of this agricultural garden contain experimental plots of all the leading economic plants of Java—such as tea, coffee, cinchona, caoutchouc and gutta-percha yielding trees, peppers, cacao, cardamons, cocoanut, sugar cane, etc., together with a fine collection of tropical medicinal and poisonous plants. I was here able to examine into several mooted questions concerning the improvement of caoutchouc bearing trees, proper tapping, etc.

The main gardens about the Governor General's palace contain all the

other laboratories. One fine building serves as the private laboratory and office of the director and office of the head gardener. Nearby the bureau are the other laboratories, arranged in a complete quadrangle. One of these is devoted to the study of the Deli (Sumatra) tobacco. The Deli planters have an agreement with the Dutch Colonial Government through Dr. Treub to provide sufficient funds each year for a period of eight years to carry on this work.

An adjoining laboratory is designed to accommodate the department of economic entomology, though the breadth of their work is best indicated by the term "zoologie agricole." A much larger building is soon to be erected to accommodate this department together with the museum of Zoology and Entomology. There are laboratories for pharmacognosy, Java coffee, Java tobacco and the large splendidly equipped laboratories for plant physiology.

At one side of the quadrangle is the renowned laboratory set aside for the use of the visiting scientists. Here have studied during less than ten years over eighty botanists, representing the following nations: Germany, Holland, France, Russia, Denmark, Sweden, England, Italy, America, Japan, Belgium and Switzerland. I was myself the second American to occupy a seat here. Visiting botanists here find at their disposal a very complete modern equipment. Dr. Treub and his large staff are ever ready to grant assistance and advice, and suggest plans for excursions into the jungle in search of desired material for study. It gives me great pleasure to extend, in this presence, with the authority of Dr. Treub, a cordial invitation to American botanists, horticulturists and agriculturists to carry on studies in Java, and I can vouchsafe you a most cordial reception



into this neutral meeting place of the world's botanists.

The list of buildings is completed by mentioning the capacious building for photography and the department of engraving under a competent artist in that profession. Adjoining the garden proper is the library in a beautiful building, one of the most complete botanical libraries I have ever seen in one building. At one side of the library is the building devoted to the large collection of Java woods, and at the other side is the building accommodating the very extensive herbarium.

A most valuable adjunct is the branch garden, at an elevation of some 3,500 feet on the side of Mt. Gedeh. Here there is a spacious laboratory and furnished rooms to accommodate students, who must bring up their provisions with them or arrange with native coolies to do so regularly. A large forest reserve of several hundred acres adjoins the mountain garden and can be used by students.

It goes without saying that a great many really temperate plants can be cultivated in this mountain garden in spite of the terrific rainfall of this entire region about Bintengorgo.

My investigation of the cultivation of sugar cane naturally took me into the lowland regions of North and East Java. At Pasoeroean, In East Java, is located one of the two experiment stations for the study of sugar cane cultivation. This station, as is the other station in West Java, is supported by the contributions of the cane planters of the surrounding districts. The total cost of the station is about \$16,000.00 per year. The director, Mr. Kobus, and his staff, are at present conducting a large number of experiments for the purpose of increasing the sugar content of sugar canes. He hopes by the continual selection of cuttings from plants

richest in sugar to secure a race of sugar canes having a maximum sugar content. I shall not weary you with the details of his studies and results, suffice it to say that up to date his work in selection has been so successful as to warrant its continuance upon a very large scale and at great expense. The entomologist finds much to do in studying the life histories of the many insect enemies of the cane, with a view always of suggesting means of reducing or preventing their ravages. The station now has certain cane sorts that appear to be quite resistant to certain insect enemies. Further experimentation along this line is now in view.

I cannot refrain from giving you a glimpse of some of the scientific work being done by Mr. Moquette, the administrator of a large sugar cane estate near the station. Here I had an opportunity, thanks to his gracious hospitality, of studying his experimental field containing over 300 sorts of sugar cane. These sorts are carefully watched in the field and analyzed each year, and the best ones are selected for further trial upon a larger scale. In this way he has secured canes suited to the different sorts of soil he has to do with, and canes ripening at different periods, so that all his canes may be cut at once when ripe, and yet the factory be constantly in operation during the grinding season. These varieties have been imported from nearly all sugar producing lands, either by the stations or by private parties.

Mr. Moquette, in common with many others, believes that the greatest hope for the improvement of the sugar cane lies in the propagation and artificial selection of seedlings. The historical account of the attempt to have lost its seed producing power, is too extensive to give at this time, but I certainly need not emphasize before this Horticul-



*Ficus Elastica*, THE INDIA RUBBER TREE, GROWING IN THE ROYAL  
BOTANIC, CEYLON.



tural Society the great significance of the recent discovery of fertile seeds of the cane. One need only recall the great advances made by sugar beet growers since the late Vilmorin showed them the results of judicious seed selection.

If one sows the seeds of any given cane—say the common Cheribon cane of Java—he will find the greatest variety of seedlings, few of which will bear any resemblance to the parent canes. And this great variation from the parent form is expressed not only in outward color, height of stem, diameter of stem, length, width and stand of the leaves, etc., but also, what is of the greatest importance, in the sugar content of the canes, and though many of the seedlings fall below the parent in respect to sucrose content, some few may exceed the parent more or less in this regard.

And as you may know, the amount of variation is much increased when two sorts of canes are crossed. And with this comes not only an increased chance of securing some desirable cane, but also one may cross two canes having each one or more very desirable qualities.

The main object of such experiments in Java has been, not so much to secure a cane richer in sucrose, but to secure a cane very resistant to the great "sereh" disease. And it can be said that the result of selecting sereh-resistant cane varieties has proceeded further in the hands of my friend Moquette and a few others than the knowledge of the disease itself among the scientific men of the region. And, to my mind, this is a very helpful sign indeed for the agriculturist, even of this country, as it is an illustration of the ability or possibility that any cultivator has of combating the insect and fungus enemies of their crops in this indirect fashion.

The work being done by Director Prinsen Geerligs and the staff of the West Java Sugar Cane Station at Tegal is largely of a chemical and technical nature. Mr. Geerligs is a chemist of world-wide reputation and is surely doing much to correct errors and introduce improved modern methods of sugar manufacture and factory control in Java. His entomologist, Dr. Leo Zehntner, has published a most valuable series of papers concerning sugar cane insects.

Southeast of the station some hundred miles I visited the extensive plantations of teak owned by the Dutch Colonial Government. At that time the trees were all in full bloom, and the sight was a grand one, reminding me, by contrast, of the German forest reserves. The introduction of teak growing into some parts of the United States should receive some attention at the hands of the United States Department of Agriculture. The Bureau of Plant and Seed Introduction promises to expand our list of cultivated species by many valuable sorts.

At Klatten the indigo planters have a well equipped laboratory for the study and solution of their chemical and agricultural problems, while at Bandoeng a laboratory for the study of cinchona culture and manufacture is kept up by the Government. Dr. J. P. Lotsy, formerly of Johns Hopkins University, has been engaged by the Dutch Colonial Government for a number of years in a study of the localization of the alkaloids and the physiology and chemistry of their formation in the bark of the cinchona species. He is for two years now attached to the Botanic Gardens to continue these promising researches under the direction of Dr. Treub.

Coffee is no longer a Government monopoly, and the "old Government

coffee" exists no longer in fact. I cannot here explain to you their methods of coffee culture, except to say that under the direction of Dr. Kramers, the specialist in charge of these studies at the Botanic Garden, the methods of manuring and pruning have been brought into accord with modern discoveries and facts.

This brief sketch will have served its purpose if it has awakened in you a keener interest in the tropics, and thereby extended your field for thought and study.

### Hints on the Purchase of Food.

Go to market yourself. Although the prices of beef, mutton, pork and other meats are not subject to great changes, the prices of fresh fish, vegetables, fruit and game fluctuate constantly. Besides you will doubtless see food that can be bought for very little money, which will make acceptable changes in your menu, and which you would not have ordered from the provision man. Among these are sheep's hearts, calves' and lambs' tongues, which may be put in brine. Served in jelly these are delicious and at the same time economical. Calve's head soup is very good. Sheep's and lamb's kidneys and brains are cheap, so are tripe, liver and pig's feet. People have prejudices against some or all of these things; but served without being named they will be relished by the majority of persons, and are highly nutritious and cheap. *Fowl* is not a cheap food, but if one occasionally has a fowl, a good and economical soup can be made of the bones left from a fricassed or baked chicken. Chicken soup proper is an expensive luxury; but giblets, the heart, liver and necks of chickens and other fowls are sold in city markets separately and cheap, and make good soup. The feet of poultry should never be

thrown away. They are sold in the markets of Europe and, like the feet of any other animal, are rich in gelatine. The nails should be chopped off and the feet thrust into the fire for a moment, after which the yellow skin can be easily pulled off. In this form they are a desirable addition to a stock, giving it extra body.

The importance of *dried fruits* as a food is not well enough understood. Dried apples are very near to bread in the per cent. of nutrients they offer, and may be made into a variety of dishes, with meats, with potatoes and with beans, also with noodles and macaroni.

Though canned goods are a convenience, their use is probably in every sense of the word a luxury, so far as the relative nutriment and price is concerned. It has been estimated that in a hundred pounds of canned string beans, for instance, the consumer would pay for 95.83 pounds of water. If a can of such string beans cost \$.30 the price of the dry matter in this package would cost at the rate of \$5.00 a pound.

*Mushrooms* are as nutritious as meat, and may be had by the intelligent suburban for the gathering.

The actual cost of *necessary* food is surprisingly low. Count Rumford gave to thousands of people portions of porridge, or "soup," as he called it, containing all the nutrients necessary for a meal, at the cost of less than half a penny apiece. President Harper, of Chicago University, has recently tried living on fifteen cents a day, and finds that it is quite practicable. *The Outlook*, in a recent article, prints the following:

"Nine cents a day is a very small allowance for a man at moderate work, and yet several instances have been observed in which food per man per day has been purchased for this sum or less." Mrs. Able says: "Numerous



instances could be brought to prove that the food for a family of six can be purchased in raw condition for thirteen cents per head per day, and that by skill in cooking, flavoring and giving the right variety of healthful and very acceptable diet, can be furnished, though it cannot, of course, contain luxuries."

HELEN G. SHELDON.

### **Progress in Veterinary Medicine.**

We learn that veterinary medicine has concerned humanity from the earliest times down to the present, both from a scientific and an economical standpoint. Its history reveals interesting and valuable writings among the Greek and Roman literature, where its discussion was associated with works on agriculture, natural history, breeding, etc.; also that in certain instances it was practiced in conjunction with human medicine, and since the religious prejudices of the times forbade the dissection of the human body, all accurate anatomical knowledge was obtained by the dissection of animals, thus early developing this branch of veterinary science and incidentally furnishing a foundation for comparative pathology.

With the beginning of the period of the Middle Ages, veterinary science was checked in its progress, but later we find a number of famous scholars engaged in its study and the writing of original and valuable works.

Its legal recognition as a profession, in classification with medicine and pharmacy, and the obligation of successfully undergoing an examination before a government board before engaging in its practice, which were instituted in Spain in the fourteenth century, were decided steps toward the advancement of the science.

However, the most important and substantial progress in the profession

dates from the institution of veterinary schools, the first of which was established by the French government at Lyons in 1762. The great success and popularity of this institution led to the establishment of a second veterinary school at Alfort, near Paris, in 1766, which soon became noted and is today one of the finest and most thorough veterinary schools in the world. Germany followed the example of France, and the Imperial Veterinary High School was established in 1790. Schools were soon established in the other leading European countries, which have steadily advanced their requirements, and the thoroughness of their work until they now stand practically on the same plane with the best schools of human medical science.

While the progress of veterinary science in our own country, which commenced with the establishment of the first school in Boston in 1835, has not been all that could have been desired, yet substantial advancement has obtained and today the profession in the United States stands upon a sure and progressive scientific basis, with prosperous and thoroughly equipped schools connected with a number of our leading universities, and chairs of veterinary science in many of our agricultural colleges, in which have been invested hundreds of thousands of dollars and among whose teaching force are found some of the foremost scientists of the times.

With this brief glance at the general history of veterinary science, let us note a few of the most conspicuous results which have followed the expenditure of so much time, energy and capital.

Chief among the fruits of the progress of veterinary science, perhaps, has been the steady decline of animal plagues, some of which have been en-

tirely eradicated, while others have been so restricted in their ravages, that while formerly they entailed losses extending far into the millions, the present losses from these sources bear but a small ratio to those formerly incurred. The greatest success along these lines has been achieved in some of the European countries through the efforts of regularly appointed district veterinarians, whose duties consist in sanitary inspection and supervision, and who make periodical reports upon the health of the district.

In the United States the Bureau of Animal Industry of the Department of Agriculture, originates and operates measures which are directed against the spread of contagious and infectious diseases. Besides this supervision by the general government in many states, an official state veterinarian is appointed by the Governor, whose duty it is to exercise general oversight over the health of the domesticated animals and to enforce measures for the eradication or restriction of contagious and infectious diseases. The large cities employ official veterinarians in various capacities of sanitary inspection and supervision, and the United States government employs many veterinarians for the official inspection of all meat to be exported.

In the armies of all countries veterinarians are employed to look after the health of the horses and mules. In most of them there is the establishment of an Army Veterinary Medical Corps, according to veterinarians the dignity of rank as officers. This does not obtain at present in the army of the United States, but its establishment is expected in the near future.

When we reflect on the sure and substantial development of the science and its achievements along scientific and economical lines, can we fail to anticipate the accomplishment of still greater things in the future.

Can there be any question of its continued importance to the great and growing agricultural industries of the country, especially in the field of preventive medicine and in the better development of the domestic animals for the uses of man. M. B. L.

---

### **Rainfall of the United States.**

To the agriculturist the annual amount of rainfall and especially its distribution is of great importance. If he knows that he can depend upon about a certain annual fall, and that it will be distributed during the growing season such that there will be at no time a serious deficiency of moisture for the growing crops, then he can feel certain that he will receive a good return for his labor.

In most parts of the United States the rainfall is sufficient and also fairly well distributed for the needs of the growing of crops. Still the rainfall is quite variable, the variation being between about four inches in Arizona to 100 inches in the vicinity of Neah Bay, Washington.

Waldo, in his elementary meteorology, divides the United States into three distinct regions as regards rainfall. The first region is all that part east of the 97th meridian. This region has an average annual rainfall of over 35 inches. The rainfall of Florida coast is about 60 inches, and the amount decreases with northward progress to about 35 inches. There is also a decrease westward in the northern part, the decrease being 12 inches from Maine to Minnesota. The second region extends to the west of the 97th meridian, with exception of the northern half of the Pacific coast, which comprises the third region. In the second region the rainfall decreases rapidly from 35 inches to 15 inches at about the 102nd meridian. Westward from this



meridian and to the north of the 42nd parallel there is little change. To the west and south of the 40th parallel there is a decrease and reaches the minimum of 2 to 5 inches in the desert region to the east of the Sierra Nevada mountains. The rainfall of the third region increases from 25 inches in Northern California to over 100 inches in Washington. The rainfall also increases from the mountains (Cascade) on the east towards the coast.

If the rainfall of the year was distributed evenly, then each month would receive 8 1-3 per cent. of the total fall. But this does not happen, as some localities, like the coast of Washington and Oregon have a wet season during the winter months due to the warm moisture-laden air from the Pacific being cooled by contact with the cold mountain slopes, while in other localities the precipitation is during the growing season. The total fall in this case may be small, but since it occurs at a time when needed it may be enough to mature a crop as in the case with a part of the Dakotas, which receive a little less than 15 inches, yet it is sufficient to raise good crops of the cereals.

These variations in the different geographical districts must have been modified or controlled by different sets of conditions, and from this the rainfall of the United States can not be classed as a single concrete system, but as composed of a number of separate and distinct types.

In the report of the Chief of the Weather Bureau for 1896, the types are given as follows, viz.: Pacific, sub-Pacific, Arizona, Mountain, Eastern Foot Hills, Plains, Gulf, Southern Appalachian and Tennessee, South Atlantic, Middle Atlantic and New England and the Lake Region and Ohio Valley.

The report shows graphically the rainfall by months of the year for each of

the districts. This shows that on the Plains, 70 per cent. and upward of the yearly fall comes in the growing months of the year, elsewhere the ratio is less, being a little over 50 per cent. east of the Mississippi river.

The conditions which affect or control the rainfall may be divided into two classes, permanent and variable. The chief permanent conditions favorable to an abundant rainfall are, first, nearness to the ocean or other large body of water; second, a location within or near the track of cyclonic storms; and third, mountain ranges, particularly those running in a direction at right angles to the direction of the rain-bearing winds.

These may act singly or in combination, and it can also be said that they are not always effective.

The variable conditions are the changes in air pressure, temperature and wind movement.

In general, the two classes of conditions are so blended together that it is difficult to assign any definite value to either of them. All that can be said, in general, is that the rainfall of any given place will range between limits previously ascertained by observation.

C. N. M.

### Farmers' Picnics.

The custom of holding farmers' picnics during late summer is a growing one. On many farms there appears to be a time between the completion of harvest and the beginning of fall seeding when a day or two can be spent away from the farm without serious detriment to the work in hand.

I think all will recognize the right of the farmer who has given 12 hours or more per day to the cultivation of his acres and the securing of his crops throughout the spring and summer, to take a little time for recreation. Having worked hard when he must he ought

to rest his body and refresh his mind when he can. I must have attended not less than a score of these picnics during the past few years, and have usually enjoyed them. I feel certain they have done much good and the custom is one that should be fostered and encouraged. Probably a large part of those who attend would not have spent the day so profitably had they remained at home. After saying this I trust I shall not be considered hypercritical when I state that in my judgment these picnics are not all that they might and should be. In other words, like many good things, they are susceptible of improvement.

Among the features to which I take exception and wherein I feel certain the average farmer's picnic can be improved, I will mention two: First, the altogether unnecessary labor and expense in preparing the picnic dinner. In many cases the extravagance of these dinners borders on the sinful, and the worst of it is that the burden falls for the most part upon the women of our households. As a rule farmers' wives and daughters are generous to a fault, and they do not like to be imputed stingy. When it is known that whatever is taken in the way of refreshments is to be placed on a common table, each housewife is tempted to contribute more than her share. She will not be outdone by her neighbor. It is this generous rivalry that leads to extravagance, both in quantity and quality. This abuse of a good custom leads in time to the exclusive family basket, and the social advantage of "breaking bread" together is lost. I trust that our sensible farmers' wives will soon find a way to correct this abuse without sacrificing too much in the way of sociability, and thus relieve themselves of what either prohibits attendance or becomes an almost intolerable burden.

In the second place, much of the speaking at these picnics is of such a eulogistic and flattering character as to seem almost insulting when carefully analyzed by the intelligent farmers who hear it. Too often a politician or some chronic office-seeker will tell the farmers they were the most favored of all

mortals, and that their life is the noblest known to mankind. I do not contend that farmers should always listen to men of their own calling. It is well at times to hear from men in other vocations. I do not protest, however, against the extravagant and insincere praises that are often lavished by the eloquent lawyer or pushing doctor, upon a calling that they were glad to shun. No possible good can result from such talk. The average farmer, instead of being grossly flattered often needs to be admonished and incited to improve his condition. Theoretically the farmer's vocation should be an enviable one. But practically it is not, for if it were we should hear less about the boys leaving the farm and thousands would be rushing into the business where hundreds enter upon it now. Let us try to respect facts. Let us characterize farming for just what it is, and count the farmer for just what he is worth, no more no less. I believe the time is coming when the farmer's calling will be the most enviable that can be named.

If those of us who love agriculture and delight in the life on the farm, shall intelligently resolve that the future of farming in this country shall show a signal and continuous improvement over its past, then the vocation will be envied. To accomplish this great end we need to infuse more thought and more study into our farming. We must break away from many cherished traditions and give up that blind devotion to the routine of our fathers, which is no longer adapted to our altered circumstances. If we do this we shall soon have an agriculture that is worthy of our great country, and worthy of the progressive age in which we live.

WILLIAM R. LAZENBY, in *Rural New Yorker*.

---

For a number of years the Yale Forest School has been a feature of Yale College. This year there was established a new course made up of a group of studies preparatory to the work in the Forest School.



ADVERTISEMENTS.

# NEW BOOK

ON

# CHEESE MAKING

BY

PROF. JOHN W. DECKER,

In Charge of the OHIO DAIRY SCHOOL, and for Ten Years in Charge of the Cheese Work at the WISCONSIN DAIRY SCHOOL AND EXPERIMENT STATION.

---

PROF. DECKER'S "CHEDDAR CHEESE MAKING" has had a remarkable career, having been translated into French and passed through two English editions. Much valuable experimental work has been done with cheese in the past five years, and Prof. Decker has gathered this all together and added it to the old book so that it is brought up-to-date.

With the manufacture of Cheddar Cheese has been included the manufacture of Swiss, Brick, Limburger, Edam and Cottage Cheese. The chapters on the Constitution, Secretion and Care of Milk, and the Department of Rennet, are especially strong.

The book is a handsome volume of 208 PAGES, 6x9 INCHES, PRINTED ON FINE ENAMELED PAPER, AND BOUND IN ART CANVAS. Exactly 100 cuts, nearly one-half of which are fine half-tone engravings, have been used to illustrate it.

Such a book should readily sell for \$2.50, but the AGRICULTURAL STUDENT PUBLISHING Co. can send it to you (*postpaid*) for \$1.75, including one year's subscription to the *Agricultural Student*.

Every farmer ought to have this book so that he can know just as well as the cheese maker what is authority on the care of milk, and the value of rich milk for cheese. Address :

Agricultural Student Publishing Co.

COLUMBUS, OHIO.

